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bers equal to or greater than either of the other two species mentioned.

There appears to be a certain amount of correlation between the fullness of the stomach and the position in which the Bluefish relax in death. Arbitrarily three postures may be described; that is, with mouth closed or "normal"; with mouth wide agape; and with head thrown back and branchiostegals spread out around the throat as if gasping for breath.

In the case of those with the head thrown back 66+ % were turgid with food while of those whose mouths were shut 74+ % were entirely empty. The writer can not offer any explanation for the existence of such a correlation, but it hardly seems possible that this condition can be due to mere coincident.

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RATTLESNAKES AND SPITTING SNAKES

How the rattlesnake got his rattle has probably been solved. Given the common habit, which many snakes have of vibrating the tail-tip when excited, and the shedding of the horny outer skin, which all snakes often must do, then the intermediate steps leading to the rattle, are doubtless more or less correctly set forth by Garman. The terminal scales having developed a constriction are not lost when shed but hang to one another until after a number of castings. The result is a string of shed coverings of the terminal spine or button forming in the aggregate the rattle. This being agitated makes the familiar sound, half mechanical or metallic and also half cicada-like when heard at a short distance. So far so good. The rattle has come into being—a slow process, quickly visualized. Why has the rattle been produced? Surely not to warn away prey; no such altruism is conceivable. The rattler lies in wait and strikes the rabbits and birds on which it feeds, with-

out rattling. At first sight, man seems to be its only enemy, but the rattle surely must be older than man on this continent. Deer and pigs sometimes kill rattlesnakes but rarely and locally only. Garman says, "By preventing cattle, horses and other animals from treading upon him, the rattling would certainly prove beneficial. It is likely that, beyond this, the greater benefits are derived in the prevention of useless expenditure of venom upon objects unfit for prey." Garman here was on the right track.

That the rattling tail serves to attract the attention of the prey away from the lethal head, so that the strike may be more successful, something which Garman also suggests, is hardly worth considering for the reason that when the creature is coiled to strike, head and tail-tip are in close proximity. What native wild animal, then, did rattlesnakes have to fear on a wholesale scale which coincided in its general distribution with some possible area where the snakes may conceivably have been evolved? The formerly wide-ranging bison fulfills the conditions. The grazing herds of bison certainly endangered rattlesnakes by treading them down and Coronado speaks of meeting "the cows" away south in what is now New Mexico. The rattlesnake bit the bison's nose—as the great Florida diamond-back often now kills the introduced half-feral cattle. The Florida rattlesnake is a giant and is specialized as to size but the more primitive plains rattlesnakes would not kill bison, although they would cause great pain. The snakes and the ruminants, then, must find it mutually worth while to avoid each other, and with the sounding of the rattle they can do so.

A point which might check this postulate would be to seek elsewhere other similar environmental conditions and see whether there some such beneficial arrangement has resulted. The African veldt is the only other region in the world where snakes abound and where hoofed animals grazed in numbers comparable with those of the western American plains.

Snakes probably found the heavy antelopes equally dangerous though unwitting foes and many antelopes probably suffered from snake bite. No rattle was evolved, however, but some of the common veldt-ranging snakes secured protection in another way. Several common cobras and cobra-allies learned to expell their poison in a fine spray for very considerable distances, and with a fairly shrewd aim at the eye. The poison, of course, is not caustic, the skin is unaffected; prey cannot be secured by this means but the moist eye allows of an absorption so rapid that sharp pain and subsequent photophobia instantly results from the contact. Gardeners who work stooping about shrubbery have come into the Bulawayo hospital with acute conjunctivitis. The Dutch call *Sepedon* the "Spuw slang" or spitting snake, a poor name, however, as the saliva is not involved. Natives know the habit and fear all spitting snakes. Here again, however, the habit must antedate man's coming, for contact between man and the snakes can hardly be conceived as sufficiently frequent to account for the modification. Moreover, the modification would not have been particularly protective since man would inevitably become increasingly prone to kill the offensive reptiles. Against hordes of grazing ruminants, however, the protection is probably perfectly efficient. The eyes are easily assailed and the injured creature rushes away followed doubtless by its comrades. The snake thus, whether aided by a warning sound or by the infliction of transitory pain, is aided at the time of its most frequent danger.

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AN UNUSUAL TYPE OF ABNORMAL COLORATION IN LIZARDS

Absence or excessive development of one or more of the dermal pigments has been noted repeatedly in reptiles and amphibians. Albinism, erythrism or melanism may result when these changes exceed the